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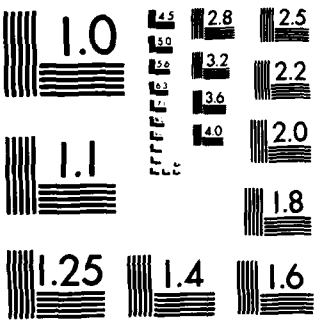

TECHNOLOGY IMPACT: POTENTIAL DIRECTIONS FOR LABORATORY MEDICINE

Final Conference Report

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Conference held in New York City September 21-23, 1983. Proceedings to be published by N.Y. Academy of Sciences.

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Laboratory Medicine, flow cytometry, cell sorting, microprobe analysis, energy dispersive X-ray analysis, protein indexing, microbiology in situ monitoring

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This conference drew together physicians (cardiologists, immunologists) and analytical scientists (clinical chemists, biomedical engineers) to discuss information critical to the ongoing development of new directions and applications of diagnostic monitoring. In recent years rapid progress has been made in understanding the biochemical and molecular biological pathogenesis of disease processes. Because of this vast expansion of our ability to diagnose and monitor human disease, new approaches to disease prevention and

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On September 21-23, 1983, a scientific conference entitled, "Technology Impact: Potential Directions for Laboratory Medicine" was held in New York City under the sponsorship of the New York Academy of Sciences. This conference was attended by 135 registered participants. This conference allowed the speakers to present previously unpublished information with regard to the application of several new and developing technologies to clinical diagnostic procedures.

Discussion of accepted, relatively routine procedures and biomedical engineering applications were specifically excluded in order that the entire conference could be devoted to discussion of recently developed technologies whose true potential for clinical application had not yet been fully evaluated. During the conference information from on-going studies in a variety of areas of biomedical engineering and diagnostic testing was presented. The unique feature of this conference was that it drew together scientists from a number of disciplines who would ordinarily not meet. The users or consumers of diagnostic procedures (clinicians) and the providers (laboratory physicians and scientists) meet for presentation and discussion of the state of the art and the planned developments in diagnostic testing.

Five separate scientific sessions were conducted during the conference. The complete content of each of these sessions and the discussion that followed will be published as a volume of the Annals of the New York Academy of Sciences.

In Session I (Flow Cytometry and Cell Sorting) the utility of this approach in the diagnosis and management of leukemias and lymphomas was evaluated. Additionally, the use of this technology was discussed in the management of renal transplant patients.

In Session II (Elemental Analysis by Physical Techniques: Energy Dispersive X-ray Analysis) discussion about the problems of tissue preparation for microprobe analysis and approaches to improving the sensitivity of this technique were discussed. The potential utility of this technology in the diagnosis of lung disease, myocardial infarction and cystic fibrosis was also discussed.

In Session III (Protein Indexing) the current research in the areas of high resolution protein separation by two-dimensional electrophoresis, computerized image analysis and data reduction were presented. Additionally, the utility and applicability of this approach in the diagnosis of specific leukemias and lymphomas as well as gastrointestinal tract polyps and degenerative neurological disease was discussed. The technology of protein indexing has progressed to the point where the proteins in as little as 2-3 mg. of tissue can be reproducibly separated and identified. Since the practical utility of this technology in the diagnosis and management of specific disease processes must now be critically and carefully evaluated, this session was particularly valuable.

In Session IV (Automation in Microbiology) new approaches to rapid diagnosis of infectious disease were discussed. These discussions centered on the application of immunomicroscopic detection of specific pathogens as well as the use of enzyme linked analytic techniques for the diagnosis of microbial infection. A large part of the discussion centered on the proper

choice of automated equipment for specific clinical applications.

In Session V (In Situ Monitoring) work was presented on the development of several devices for the direct measurement of biologically important analytes (glucose, bilirubin, ions) in the patient. The need for such in situ analysis has been driven by the need for more rapid and continuous assessment of critically ill patients. One note of caution was raised during this session with regard to the quality control and reproducibility of in situ devices over prolonged periods of time.

The common theme that linked these sessions was the impact and growing force that engineering and applied science are exerting on the approaches being taken in the planning and design of new procedures for the rapid, sensitive and accurate diagnosis and monitoring of disease processes. Many speakers emphasized the necessity of technological advances before further understanding of disease processes can be gained and more effective therapies developed.

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